Special Articles on the Town, the Citizen, and the Sewage Problem.

CALIFORNIA STATE BOARD OF HEALTH.

MONTHLY BULLETIN

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REGULAR MEETINGS

The California State Board of Health meets regularly the first Saturday of each month, but the stated meetings of January, April, July, and October constitute the quarterly meetings required by law to be held at the Capitol of the State.

By courtesy of the University of California the Food and Drug Laboratory and the Hygienic Laboratory are located in University buildings at Berkeley, California.

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JUNE BULLETIN.

THE FOURTH OF JULY AND ITS CASUALTIES.

By Raymond Russ, M.D.

The advent of our great national holiday is a cause for alarm to many a fond parent. The average citizen will possibly dismiss the question of Fourth of July injuries with a laugh. "Boys will be boys," he exclaims; "let the boy enjoy himself while he is a boy." He still remembers the odor of the punk, the fascination of burning powder, the delights of setting them off and the glee which the hazards of fireworks engenders. In the individual's experience, Fourth of July accidents may not have been frequent occurrences; but to the surgeon who is called on at dispensary and hospital to treat the many injuries resulting from the common method of celebrating our national festival, the matter assumes a most serious aspect. Every patriotic American would give his life's blood in defense of his country, but is there any reason why he should sacrifice his future to celebrate her birthday?

The most dangerous factor in the popular way of celebrating the Fourth of July is the blank cartridge pistol. During the past seven years 794 persons have lost their lives by this means as the result of accidents upon the Fourth. Most of these victims were bright, active boys, destined to make splendid citizens, and yet they have died from tetanus, or lockjaw as it is popularly called, possibly the most terrible of all deaths. The horrors of this disease must linger long in the minds of the most stolid physicians.

As the result of our last routine celebration of the glorious Fourth there were 215 deaths and 5,093 non-fatal injuries. Of these 150 boys and girls contracted lockjaw and 84 per cent died. Others through gunpowder accidents lost their sight, their legs, arms, hands or fingers. Surely it is a lamentable method of celebrating a great day. If the Government had selected the 125 children who died from lockjaw and deliberately shot them all it would have saved these poor sufferers many days of indescribable misery. Supposing that we were to return to the times of ancient India and celebrate this great annual event by throwing 215 boys and girls under the relentless wheels of the awful Juggernaut. Annually we make this sacrifice, but some years it is many more; it amounted to 466 in 1903. The Greek writers tell us that the Athenians were obliged to sacrifice many children to the Minotaur, but the Athenians made this sacrifice only once in nine years while ours is an annual affair and amounts in numbers to the carnage of a great battlefield. It may be well to die for a lofty purpose, to give our lives to some great cause of humanity, but there is no glory in being killed in a celebration.

Prohibition is the solution of the problem and in Baltimore, Cleveland, Washington and San Francisco, where prohibitive legislation has been enforced, the firecracker and the blank cartridge no longer reap their annual harvest. Practically, there is but one class of people, the dealers in fireworks, who seriously object to these laws.

Until the time comes when such regulations are general, the great number of casualties upon the Fourth of July will continue. It is well, then, that we should know a few simple rules necessary to prevent tetanus or lockjaw. Ragged, dirty wounds in which great injury has occurred to the tissues are the most favorable sites for this disease. The wound should be freely opened as quickly as possible and great care taken to remove all dirt and foreign matter. It should then be cauterized with a 25 per cent solution of carbolic acid and a mild antiseptic dressing applied. Such wounds should never be closed, but should be allowed to heal by granulation. The part should be carefully washed in a mild antiseptic solution and the dressing renewed each day. The use of the antitetanic serum has proven very valuable as a prophylactic, although its employment in cases where the disease is already established is not so satisfactory. Fifteen hundred units of the antitetanic serum should be subcutaneously injected in all cases in which the development of lockjaw is feared.

It is high time that a saner and more patriotic method of celebrating our great national holiday should be adopted. The Fourth of July should not be a day of horror and anguish as it has been in so many families. There are many methods of celebrating more patriotic than the burning of gunpowder. This great holiday should be an occasion for national inspiration, for renewing our sense of patriotism which may have grown sluggish in the year's whirl of business, for recalling the great principles upon which the very foundations of our country rest.

THE BIOLOGY OF SEWAGE PURIFICATION AND THE FUNCTION OF THE SEPTIC TANK.

By GEORGE T. PALMER, B.S., Sanitary Research Laboratory of the Massachusetts Institute of Technology.

So extensively has the septic tank been advertised as a method of sewage disposal within the past few years that the mistake is apt to be made of regarding this process as a complete and satisfactory method in itself. A slight familiarity with the exact function of the septic tank will readily convince one that such is not the case.

Let us first understand the purpose of any sewage disposal method. Sewage is merely that portion of a community's waste matter that is carried away through underground sewers. While street wash, waste water from sinks and bath tubs, and manufactural wastes are generally present in a city sewage, the offensive element is partially decomposed urine and feces from man and animals. Matter of this character is odoriferous and repugnant to the senses of sight and smell. Furthermore, it may contain the germs of disease from the bodies of people contributing to the sewers.

For these three reasons, therefore, sewage must be taken care of, (1) so that the disease germs will not have opportunity to come in contact with man and animals, (2) so that the smell will not reach populated districts, and (3) so that the characteristic paper and sediment will not betray the former associations of the liquid.

Fine screens or sedimentation basins will remove the coarser material that offends the eye and gives sewage its muddy appearance.

The smell may be obliterated by oxidizing the offensive matter. Free access of air is therefore provided by letting the sewage trickle over several feet of crushed stone, clinker or any coarse, not easily broken or soluble material. Or sewage may be run through sand where active oxidation is assisted by some straining action. The sewage may even be sprayed into the air or have air bubble through it.

The diseased germs are partially removed during the various processes just mentioned, but to reduce their number to a minimum and make the sewage effluent as low in bacterial numbers as the body of water into which it empties, some very fine straining method must be used or else a substance added that will act as a poison to the germs.

All sewage disposal plants are, therefore, designed to accomplish these three objects to some degree, and the ideal plant is one that will remove the suspended matter, oxidize the soluble matter, and kill the disease germs.

It would necessitate a vast amount of tabulating to record the various devices and combination of devices now in use in sewage disposal practice. It is safe to state, however, that no two communities have identical systems, either in the devices used or in the degree of purification effected.

Just what part does the septic tank play in the purification problem? The septic tank is merely a container that facilitates the septic process. This septic process consists in bacterial activity in the absence of ogygen resulting in the conversion of solids to liquid. When sewage is left to stagnate, the oxygen dissolved in the water is first used up in burning (oxidizing) the simple carbonaceous and nitrogenous matter present.

Sewage in the first place is not a simple substance, but must first be eaten and split apart by the bacteria. In passing through the bodies of the bacteria it is more elementary than when it entered. Similarly human excrement is more elementary in character than the food that is eaten. The first group of bacteria passes the food on to another group which in turn selects desired materials and then passes it on to the next class. As this material becomes less complex it more readily unites with oxygen either to be "burned" and pass into the atmosphere as a gas, or to remain in solution as a carbonate, sulphate or nitrate. Solid matter thus is partially changed over to a liquid and gaseous condition.

But why is it necessary to exclude oxygen during this process? As long as the matter must eventually be oxidized, why not give it all the oxygen it can stand and as fast as it can be used? Because there are types of bacteria which can not do this destructive work in the presence of oxygen. Human beings do not thrive in the presence of carbon dioxide or ammonia. A hot, sultry day is depressing whereas a cold, clear day is exhilarating. The hot sultry day is to the human being what an excess of oxygen is to these particular bacteria. Consequently, it behooves us to make their surroundings conducive to their best efforts.

To be sure, oxygen must be supplied to this broken down organic matter, but this must be delayed until the bacterial laborers have finished their work on it and have brought it to the stage where the finishing touches can be applied. Emphasis must be laid on the fact that this "breaking down" action of the bacteria means both a physical

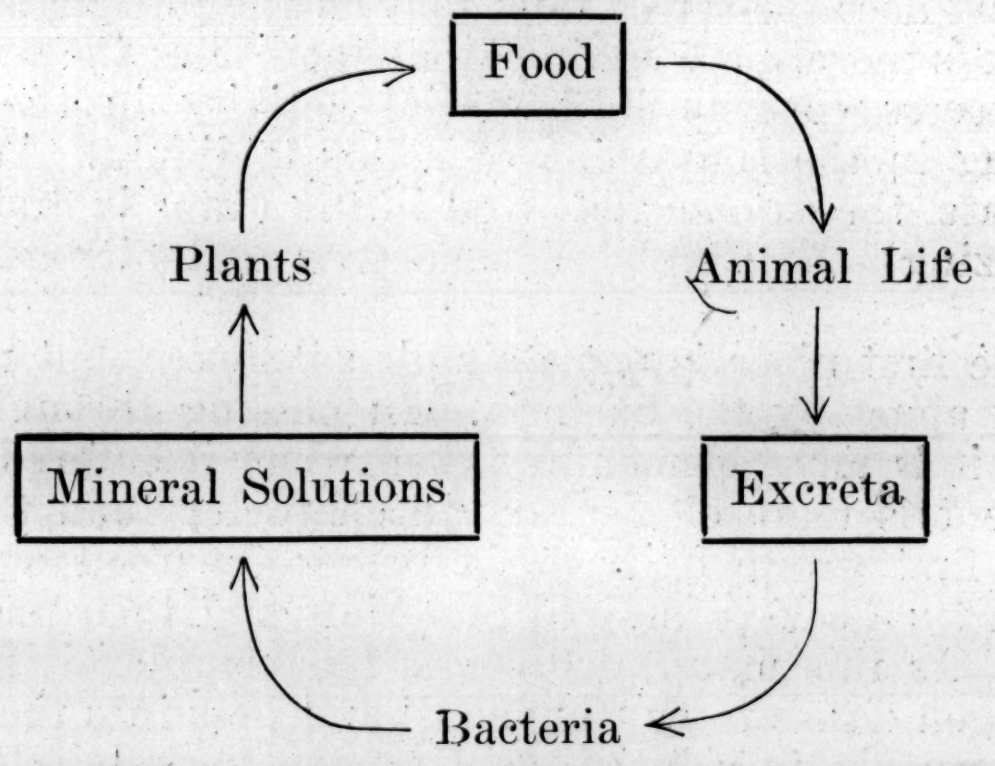
and a chemical destruction. Coarse matter becomes finally divided, and complex chemical substances become changed into many elementary ones.

After the oxygen in solution unites with the simplest organic material, the oxygen in combination with other elements, such as nitrates, sulphates, etc., is loosened to unite with matters that will gasify and leave the liquid, as carbon dioxide and carbon monoxide.

When the available oxygen has been practically eliminated from the liquid, then a septic or putrid condition exists.

The danger of an overseptic condition must be warned against. Much better is it to shorten the digesting period rather than prolong it. In a tank where the bottom deposit is constantly washed by the incoming sewage and toxic or poisonous substances thereby prevented from accumulating, a semi-septic stage is most satisfactory, as a number of destructive bacteria which require some oxygen can also labor here to advantage.

Consequently, the scum formed by the lighter suspended matter rising to the surface is not necessary to the successful septic tank, and actually becomes a source of trouble by growing large enough to materially decrease the capacity of the tank.



The ideal condition exists when the inorganic matter only is deposited in the bottom of the tank and the finely divided organic matter is constantly passing out in the effluent. Shorter storage periods will accomplish this result and accumulating sediment is thereby reduced to a minimum.

To better understand the changes undergone by organic matter in its decomposition and the part played by bacteria, reference may be made to the diagram representing the "cycle" of "organic matter."

Man and other animals eat Food and convert it into Excreta, a much less complex condition. Bacteria eat this Excreta as their food and make it over into Mineral Solutions. Plants feed upon this mineral matter and thereby build up their own body tissue which becomes food for animals.

Thus animals, bacteria, and plants mutually assist each other in their struggle for existence.

If animal life were eliminated from the earth, bacteria would have a difficult time in finding easily digested food. Untouched by man,

horse, earthworm, etc., plant life would be coarse fare for bacteria. Eliminating bacterial life would be fatal, however, as plants are absolutely unable to live upon animal-food or excreta. Their nourishment must of necessity be in a mineral form. Now, if we suppose the earth to be deprived of all plant life, then animals would have to live on each other which would soon result in a speedy depopulation of animal life beginning with the smaller and weaker forms.

The septic tank, then, is a destructive furnace or a disintegrator. It demolishes complex organic matter making it into simpler chemical substances. It has a mechanical action in converting bulky matter into a finely divided state and partially into solution. It kills out some of the disease germs that enter.

If successfully operated, therefore, a septic tank makes sewage less obnoxious to look upon. On the other hand, it intensifies the smell and has little effect on the germs.

Obviously the septic tank is not a complete process in itself. It is, however, a good preparatory school. Its products are crude and unfinished but promising. Additional training meets receptive ground and progress is rapid.

To run a septic effluent of considerable volume into a small stream would befoul the stream and enormously increase its bacterial content. Added to a large stream, the effluent would undoubtedly find sufficient dissolved oxygen in the water to subdue its odor, but even here with great dilution, the disease germs are being added to the water in large numbers, and communities so doing are menacing the health of others below who come in contact with the waters of the stream.

Septic sewage taxes the oxidizing power of a stream more than an equal amount of untreated sewage because of the rapidity of its union with oxygen. Unless the stream is well supplied with oxygen, this sudden severe drain will exhaust the oxygen present. Crude sewage requires as much oxygen eventually but because of its less decomposed state it does not take it up so readily. Particles of crude sewage may be carried along for twenty hours before uniting with oxygen. Septic sewage would more likely combine with oxygen in the first half hour of its passage.

Besides disposal into a body of water not used for domestic purposes, there are two other courses open for the final disposal of the effluent. It may be applied either to agricultural land or to an artificial filter bed.

If the fertilizing value of the effluent is to be made use of, then vegetables and fruits for human consumption must not be grown on the land for fear of contamination by disease germs. Nut trees and fodder can probably receive the effluent with impunity. Truck gardens may be fertilized, however, by subsoil drains properly laid within a foot or so of the surface of the ground.

If the effluent is small in quantity a filter bed of coarse material is out of the question because of the necessity for a continuous flow. A loose, sandy soil is the only recourse for the small disposal system. Here the intermitent flow is advantageous, and, in fact, necessary.

Filtration through two or three feet of sand very satisfactorily completes the purification problem. The unstable, odorous and germ laden septic effluent is here oxidized, made presentable to the most fastidious sense of smell, and largely robbed of its bacterial wealth.

AN IDEAL SUMMER CAMP.

SANITATION AT CAMP CALIFORNIA.

By N. D. BAKER, Sanitary Engineer Inspector, California State Board of Health.

[The excellent conditions prevailing at Camp California suggest the publishing of the following detailed description in the hope that it will prove useful to summer resorts, logging camps, and all localities in which a large number of people are gathered together for a portion of the year.—EDITOR.]

Camp California is conducted as a summer school of surveying by the Civil Engineering Department of the University of California and, from May 15th to the middle of July, from 75 to 150 men are there continuously. The University has recently purchased a new permanent camp site on Scott's Creek, near the ocean, about 20 miles north of Santa Cruz, and every effort is being exerted by the department to make the place a model of camp sanitation. It is equipped with a pipe water system, including a slow sand filter and storage tank, and with two septic tanks or cesspools to dispose of the wastes from the toilets at the student quarters and the wastes from the kitchen sinks. The ground about the camp is of a gravel formation and favorable for cesspool disposal.

Water Supply.—Most of the water is piped from a spring high on the hillside, but at times it has been found necessary to add to this from the creek. The entire supply is filtered by the process known as slow sand filtration. The filter tank has an inside diameter of 17 feet 6 inches and is 9 feet deep. The filtering material consists of 3½ feet of sand and 9 inches of gravel graded as follows: 2 inches of 1-16 inch to ¼ inch gravel, 2 inches of ½-inch to ¾-inch gravel, 5 inches of ¾-inch to 2½-inch gravel. A head of 4 feet is maintained on the top of the sand. The area of the filter is 240 square feet or .0055 of an acre. At a filtering rate of 3,000,000 gallons per acre per day the capacity of the plant may be taken as 16,500 gallons per day. This is a conservative figure. At the extremely high rate of 10,000,000 gallons per acre per day the capacity would be 55,000 gallons per day. The efficiency would probably be greatly reduced if run at this rate.

The filtered water reservoir is a wooden stave tank 17 feet 6 inches in diameter and holding about 6 feet of water. Capacity 10,500 gallons or nearly two thirds of a day's supply. The filter is equipped with an orifice box at the outlet and an automatic device for regulating the flow and for showing the rate at which the water is being used at any time. Gauges show the static heads at the top and bottom of the filtering material and at various depths throughout it.

It is intended that the plant shall be used for purposes of instruction, and to this end, accurate records are kept of the readings of loss of head and rate of flow. Bacterial counts are made each day of samples of water taken before and after passing through the filter. These counts are made on gelatin plates after forty-eight hours, and the work is done at the filter house. It is interesting to note that at first the counts of the unfiltered water were consistently a little lower than those of the effluent. The latter, however, seemed to contain but one kind of bacteria, while the former were of several different kinds. After the filter has been in operation for some time it is expected that it will greatly reduce the number of bacteria present.

Besides the diversion line, filters and filtered water reservoir, the water system includes a line with taps for street sprinkling, a wash-place for the students and another for the faculty, toilet attachments, and taps for the kitchen sinks. The entire system was installed at a total cost of about $1,500.

Disposal of Wastes.—The toilet at the student quarters has twenty seats placed in two rows over troughs. The troughs are made of one inch redwood lumber smoothly planed inside and liberally coated with hot asphalt. Two urinal troughs each 16 feet long are made of the same material. The entire building has a smooth finish, concrete floor and is provided with hose connections for flushing. The device for flushing the closets is very simply constructed, consisting of a wooden bucket of trapezoidal cross-section. This is so balanced that, when empty, its center of gravity is on one side of the pivot and it is held upright. When full of water its center of gravity is transferred to the other side causing the bucket to tip and empty its contents. A small stream of water is kept running into the bucket continuously and at intervals empties itself into the troughs of the toilets; the intervals can be regulated by adjusting the stream from the pipe or by changing the balance of the bucket. The amount of each flush is about eighty gallons, and during the day it is arranged to flush at intervals of about fifteen minutes. At night the water is shut off. Estimating the average intervals at 15 minutes for twelve hours per day, the use of water for this purpose alone is about 4,000 gallons per day.

Cesspools.—The cesspool for the student toilets is 7 x 7 x 5 feet lined with 2-inch redwood and designed to hold 4½ feet of sewage. The effluent is drawn off through eight 2-inch galvanized iron pipes from a depth of 18 inches below the surface; the sewer enters at the same depth. These outlet pipes extend 4 inches outside the box. In making the excavation, a space of 12 inches was left on all sides and 8 inches under the bottom. This space was back-filled with stones and gravel, special care being taken to place the stones about the outlet pipes so as to facilitate seepage. The roof of the structure is two feet below the ground surface. The cesspool for the kitchen differs from the above only in size. It is 5 x 5 x 5 feet, designed to hold 4½ feet of sewage. The discharge from the sinks enters through a 5-inch vitrified pipe and there are 8 outlet pipes of 1½-inch galvanized wrought iron.

The camp site was laid out and the water system and sewage disposal tanks were planned and built under the direction of the Department of Civil Engineering of the University of California.

PRIVIES—SANITARY AND INSANITARY.

By Raymond Russ, M.D.

It is, indeed, fortunate that we live not only in a thinking and sensible age, but also at a time when diffidence and false modesty have been thrown aside and we are able to deal with subjects, which a few years ago would have been tabooed, frankly and without cavil. The great advances which recent years have wrought in sanitation have made this necessary. Modern sanitation is but the adaptation to practical usage of the great truths which scientific medicine has discovered, and

so many of these facts bear directly upon the individual, his habits and his daily life, that plain speaking is absolutely necessary.

All men were at one time soil polluters, and their daily functions were performed without regard to their environment; but with the growth of civilization came the development of modesty, that virtue which is now innate, and the calls of nature were done in seclusion. The privy owes its existence not to sanitary needs, but to privacy and seclusion, which have always been its important features. These considerations determined its location and its construction. Little attention was paid to convenience and comfort, and as for health, that question was never even thought of. The modesty which prompted its construction forbade its being a theme of discussion; it was a topic of conversation only for the ribald and obscene. The pestilential odors which rose from its vault in summer made it a place to be avoided as long as possible; its remote location caused a visit to it to be dreaded in the cold of winter.

"Did you ever stop to consider," said a physician of long experience, "how much the modern toilet facilities have accomplished for the health of the community. In the old days it was no uncommon occurrence for people to go three and four days and even longer without a bowel movement. Think of the damage caused by the absorption of this toxic-material,—the dull eye, the coated tongue, the jaded countenance, and the *ennui* and lethargy which personal negligence had engendered."

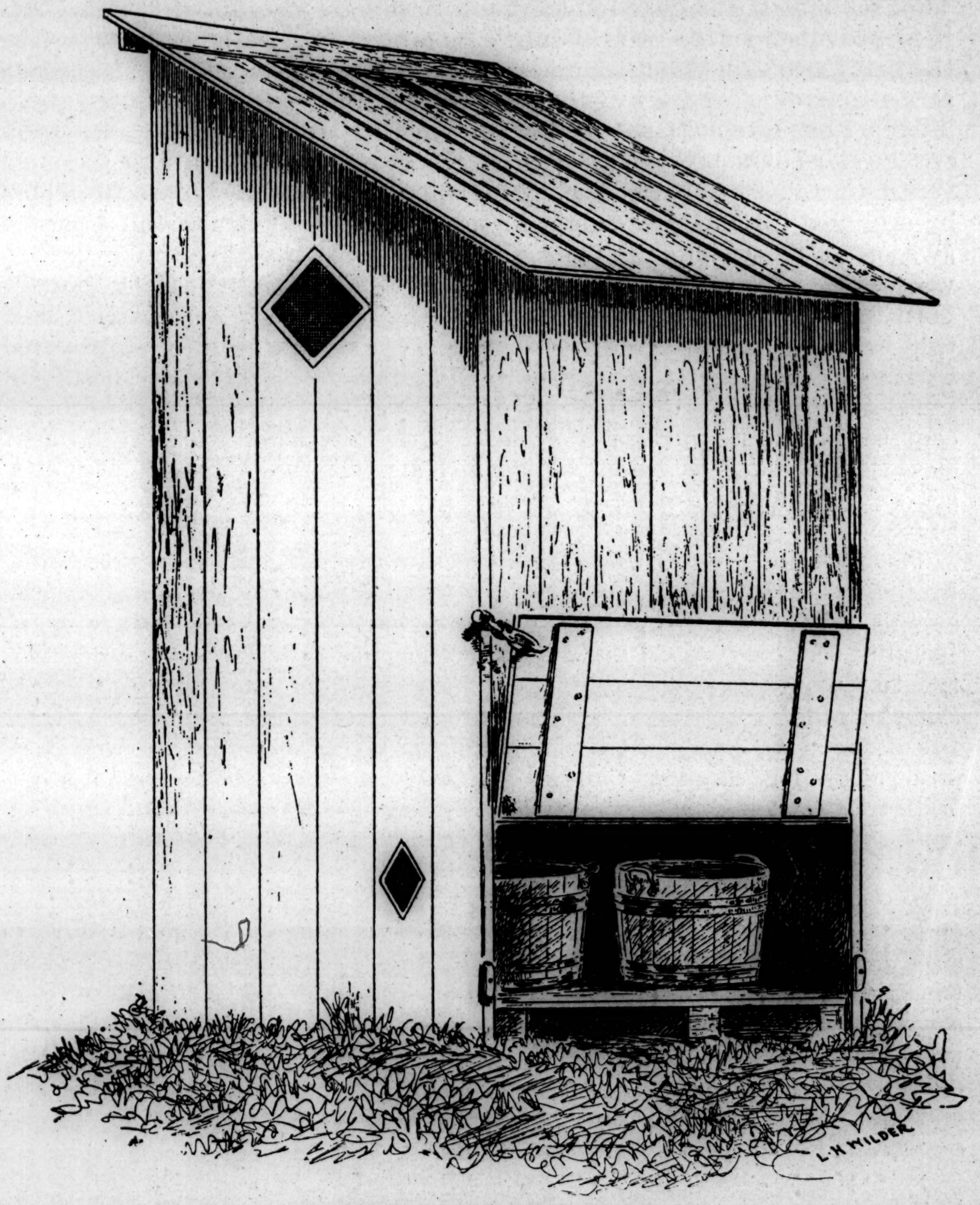
A town in establishing an adequate sewage system, takes the primary and most important step in its physical betterment; it can do no other single act which will be of such great benefit to all. An adequate sewer system is the basic principle of sanitation. Where the removal of sewage to large bodies of water has been impossible the septic tank has accomplished wonders. Built on bacteriological facts, its use is but little understood except to those who have had a good grounding in this subject. Mistakes in its construction are many and the care of the plant is frequently faulty. Notwithstanding these facts, the septic tank works so admirably and requires so little attention that its employment has proven most satisfactory. It has meant much to inland towns and rural districts, for it has done away with the dangerous cesspool and has made a good system of sewage disposal possible.

The privy at best is a poor expedient and should be regarded as a temporary makeshift. But more than this, the average privy is an element of danger, and it has been only in recent years, when sanitary science has made such strides, that its bearing on disease and its propagation has been understood. At present it must be regarded as one of the greatest menaces to the health of the community. Now that we appreciate the dangers of soil pollution,—the contamination of water supply, the great rôle which flies and other insects play in the dissemination of disease, the evils which arise from irregular habits of visiting the toilet, the case against the outhouse becomes a strong one.

No better example of the evils of soil pollution can be cited than the dreaded hookworm disease which has wrought such havoc among the poor whites of the South and has been such a factor in reducing their social status. It is a condition which is easily controlled by sanitation and fairly easily eradicated in the individual.

Only a beginning has thus far been made in the study of the parasites which infest the human intestines and the diseases to which some of them

give rise, as hookworm, tapeworm, amœbic dysentery, and which they readily transmit. Sufficient, however, is known to make apparent the great dangers of soil contamination and to make the safe disposal of human excreta a matter of the greatest importance. Add to these the bacterial diseases, such as typhoid fever, and the importance becomes



Stiles' Plan for a Sanitary Privy.

apparent of protecting the excreta from flies and from dissemination by rain, and by chickens and swine, and depositing it in one place from which it can be removed at frequent intervals and properly disposed of.

The vault privy which is in general use does not guard against these evils. Moreover, it is too often built in close proximity to the well, and contamination of the water supply from this cause is not uncommon.

The filthy condition of these open, fly infested vaults needs no comment. It is obvious that the sanitary privy must contain a receptacle for the excreta so arranged that it can be readily removed.

Stiles' plan for a sanitary privy is shown in the illustration. (U. S. Public Health and Marine Hospital Service Reports, April 29, 1910.) This resembles in construction those in general use but differs in that it is provided with a well fitting door and a box with a top, which is the privy seat, a bottom, which is a continuation of the floor of the room, a front, made of the boards extending from the seat to the floor, and a hinged back so constructed as to open easily and fit tightly. Its sides are the sides of the room and these should be provided with wire screened ventilators just below the seat. The hole in the seat should be protected by a hinged lid and this should be so arranged that it will fall forward as soon as the occupant rises. The room must also be provided with wire screened ventilators.

In the box above described should be placed one or more well calked tubs or half-barrels to receive the excreta. The tubs should be provided with handles so that they can be readily removed. They are best held by cleats nailed to the floor in order that the tub may be properly centered. The lid making the back of the box should always be kept closed. The buckets should be cleaned at least twice a week, but once a week will answer during the winter months in the cold regions of this State.

The question of the use of disinfectants is still an open one; some prefer to partly fill the tub with a 1 to 20 solution of creosole, but the expense of this disinfectant may be a deterring item. The other disinfectants commonly used are generally not employed in sufficient quantity to make them serviceable. Some prefer to put a layer of dry earth, ashes or sand in the tub and to cover the excreta each time with a shovelful of the same material from a barrel placed in the room for that purpose. This has the disadvantage of favoring carelessness, but this can be partly remedied by arranging a chute over the seat so that sand, or dry earth can be readily introduced from a storage box placed outside.

It is well to have a double set of tubs so that they can be used alternately. If this be done tub No. 1 is set aside and covered but not emptied until the time has arrived for it to replace No. 2. Stiles emphasizes the fact that this procedure gives the fermentative bacteria more time to act before the contents are finally disposed of. After emptying, a quantity of loose earth should be placed in the tub before it is again used. The excreta thus treated should be burned, or buried at some distance from the source of water supply. It makes excellent fertilizing material, but it should be immediately spaded under and should never be deposited about vegetables which are eaten uncooked.

No extensive argument is generally needed to convince the public of the dangers arising from the average privy. Its unsightly appearance, the swarms of flies which hover around it, and the disgusting odors which it emits, all make a strong impression on the lay mind. The public are strongly imbued with the dangers lurking in conditions that are offensive to the special senses. Ambrose Pare believed that the plague that swept Paris in the sixteenth century had its origin in the nauseating smells which were everywhere; children still hold their noses when passing a smallpox sign. If an infectious disease, as typhoid fever,

were offensive to sight or smell its control and elimination would be a much easier problem for the sanitarian.

It would seem, then, that the replacement of the disgusting privy by an adequate sewage system would be a comparatively easy matter. Opposition is found, however, in every community. The inhabitant who believes in the old order of things, who preaches that what was good enough for his father and his grandfather is good enough for him, who would have us continue with the good old régime when contagious and infectious diseases numbered their victims by the score, is always in evidence. But the time has now come when the privy must give way to more modern methods; as long as it does exist let us make it as inoffensive and as sanitary as possible.

MUNICIPAL PROGRESS IN SEWAGE DISPOSAL IN CALIFORNIA.

N. D. Baker, Engineer-Inspector, State Board of Health.

The following data has been compiled from the *Engineering Record*, *Engineering News*, and from records of the State Board of Health to show that steady progress has been made during the past six months in the sewage disposal and water supply improvements of California cities.

It will be noted that every section of the State is represented in these lists.

MUNICIPAL IMPROVEMENTS IN SEWAGE DISPOSAL.

[The date given is that on which the reference was published.]

December 25, 1909.—Santa Paula. A movement looking to the building of sewers.

January 6, 1910.—Long Beach. City Engineer is making plans for new system.

January 6.—East San Jose. Plans accepted December 21 for new system. February 10th, contract for sewers made at price of $29,900.

January 13.—Whittier. A. W. Tryce, City Engineer. Contract for sewers and septic tank let.

January 22.—Berkeley. J. J. Jessup, City Engineer. Sewer improvements planned to cost about $500,000.

January 22.—Monrovia. Soon to have an election to vote on $100,000 bonds for sewers.

January 20.—Bakersfield. Contract for septic tank made at $14,500.

January 27.—Colton. Plans for sewer system to cost $65,000 completed. April 23d, bonds for sewer passed.

January 27.—Imperial. J. T. Rice, City Engineer. $35,000 bonds sold for sewers. April 14th, contract for sewer system awarded at $33,346.

January 29.—Mayfield. Plans for sewer system accepted. Estimated cost, $37,000. February 3d, bids called for by town clerk. March 24th, contract awarded for $21,785.

February 10.—Roseville. Propose to construct sewer system to cost $35,000. May 14th, $90,000 bonds voted for sewer system.

February 12.—Sonoma. Bonds for sewer system work to be voted.

February 17.—Lodi. Plans for sewer system accepted. March 26th, contract for sewer construction awarded at $32,540. Pipe contract awarded at $17,401. Total cost to be $49,941.

February 24.—Newman. On February 8th contract was awarded for sewer system at $23,079.

February 26.—San Anselmo. Bonds for $15,000 sold to build sewer system.

March 5.—Pleasanton. Sewer bonds for $40,000 passed.

March 19.—Oroville. B. L. McCoy, City Engineer. Preliminary report on sewer system. Estimated cost, $120,000. On March 31st voted $120,000 bonds for sewer system. May 21st, plans accepted for sewers.

March 26.—Santa Clara. Storm sewers are planned, to cost $5,000.

March 26.—Chico. To vote on bonds for $35,000 for storm sewers.

March 31.—Porterville. Sewer extensions and improvements planned to cost $40,000.

April 2.—Coalinga. Talk of installing new water system.

April 9.—Orland. T. J. Hicks, chairman of committee to look into question of installing sewer system.
April 16.—Pasadena. Contract for septic tank awarded for $10,000.
April 23.—Etna Mills. Talk of installing an adequate sewage system.
May 7.—Santa Ana. Plans being made for outfall sewer to cost $35,000.
May 21.—Sawtelle. A movement is reported to put in sewers.
May 28.—Brawley. City Engineer, C. J. Park. $18,000 bonds passed for sewers.
June 4.—Covina. Plans for sewer system and sewage disposal being made.
June 4.—Ventura. Plans for sewer system being made.

MUNICIPAL IMPROVEMENTS.—WATER SYSTEMS.

January 6, 1910.—Escondido. Mutual Water Company will bore an 1,800-foot tunnel for water and build 600 feet of open-joint cement tile line.
January 6.—Calexico. $30,000 bonds voted for new water system. To have three concrete reservoirs, one to hold 50,000 gallons, and two settling basins and an air pressure tank.
January 13.—Newport Beach. Voted $10,000 bonds to purchase and extend water works.
January 13.—El Centro. Plans being prepared for a municipal water works.
January 22.—Colusa. J. W. Kearth, City Engineer. Contracts let for construction work on new water system to the amount of $47,935.
January 27.—Fullerton. Franchise granted for a domestic water system. Estinated cost, about $40,000.
January 29.—Sacramento. Bonds for $666,000 to be voted on for filters. Later, bonds failed to pass.
February 12.—Brawley. City Engineer, C. J. Park. Bonds for $40,000 voted for new water works.
February 19.—Santa Barbara. Bonds for $300,000 soon to be voted on for new water system.
February 26.—Monrovia. Report complete pipe system is to be installed. Henry Gierlich, City Engineer. March 3d, contract soon to be let.
February 26.—Lodi. Plans being prepared for municipal water system.
March 5.—Winchester. New water works to be installed.
April 16.—Auburn. Considering a plant to sterilize water supply.
April 28.—Biggs. Contract let for new water system.
May 14.—Visalia. M. L. Weaver, City Engineer. Voted $95,000 bonds for improvements on Mill Creek.
May 20.—Tulare passed bonds for an excellent sewer system.
May 21.—Black Diamond. A movement proposed for a municipal water works.
May 19.—Imperial. Will build a pipe line from the Brawley main canal to furnish water for domestic purposes. Cost, $10,000.
May 28.—Portola. Water works thought of. Nothing definite.
June 4.—Kingsburg. It is proposed to vote bonds for water works.

The following table gives the sewage disposal data for a partial list of the cities and towns which the State Board of Health has been studying during the past year.

Nineteen of these communities discharge their sewage into salt-water; fifteen without previous treatment; four after septic tank treatment. Thirty-five of them use their sewage for farm irrigation; eleven without previous treatment, twenty-four after septic tank treatment. Fifteen of them discharge their sewage into "fresh-water" streams; twelve directly into streams without previous treatment; three after preliminary treatment in a septic tank. Four discharge sewage on the surface of low waste land; two directly; two after treatment in a septic tank.

The twelve communities discharging their sewage directly into "fresh-water" aggregate a total estimated population of 123,000. The population of those communities in this partial list, which have provided treatment, sewage farming or discharge into salt-water totals 1,530,000. Estimating the total population of the State at 2,056,190, it will be seen that approximately four fifths of the population of California live in communities already provided with sewers. Seventy-three towns and cities are represented in this tabulation, of which number

only twelve have not attempted to remove their sewage from the streams or to treat it before discharge. The Sacramento and its tributaries, the San Joaquin and its tributaries, and the Salinas-Pajaro rivers represent the surface streams receiving this raw-sewage.

Sewage Disposal in California Towns. Partial List.

Town.	Population.	Septic Tank.	Irrigation.	Dilution.		Remarks.
				Stream.	Salt Water.	
Alameda	25,000	No	No	No	Yes	San Francisco Bay.
Alamitos Bay		Yes	No	No	Yes	Summer resort.
Auburn	2,500	Yes	No	Yes	No	Auburn ravine.
Bakersfield	10,000	Yes	Yes	No	No	To be installed 1910.
Benicia	2,500	No	No	No	Yes	San Pablo Bay.
Berkeley	40,000	No	No	No	Yes	San Francisco Bay.
Cloverdale	1,000	No	Yes	No	No.	
Colton	3,500	No	Yes	No	No.	
Colusa	1,500	Yes	?	No	No	Installed 1910.
Corona	3,600	Yes	Yes	No	No	To be installed 1910.
Dunsmuir	2,000	No	No	Yes	No	Sacramento River.
El Centro	2,000	Yes	Yes	No	No.	
Eldredge (Sonoma State Home)	1,000	Yes	Part	Part	No.	
Emeryville	5,000	No	No	No	Yes	San Francisco Bay.
Folsom (State Prison)	1,100	Yes	Yes	No	No	Gardens irrigated.
Fresno	25,000	Yes	Yes	No	No	Municipal Farm.
Grass Valley	6,000	No	No	Yes	No	Wolf Creek.
Hanford	6,000	Yes	Yes	No	No.	
Hermosa Beach	(1,000)	Yes	Yes	No	No	Summer resort.
Imperial	2,500	Yes	Yes	No	No	Installed 1910.
Kennett	500	No	No	Yes	No	Sacramento River.
La Jolla	1,400	Yes	No	No	Yes	Pacific Ocean.
Livermore	2,200	Yes	Yes	No	No.	
Long Beach	20,000	Yes	No	No	Yes	New tank planned 1910.
Los Angeles	350,000	No	No	No	Yes	Pacific Ocean
Los Banos	1,000	Yes	Yes	No	No	Installed 1910.
Madera	3,000	No	No	No	No	Run on to field.
Marysville	6,000	No	Yes	?	No	Island farm.
Merced	3,500	Yes	Yes	No	No	Municipal farm.
Modesto	5,000	No	No	Yes	No	Tuolumne River.
Naples		Yes	No	No	Yes	Summer resort.
Nevada City	3,000	No	No	Yes	No	Deer Creek.
Newport Beach		No	No	No	Yes	Summer resort.
Oakland	230,000	No	No	No	Yes	San Francisco Bay.
Ocean Park	3,000	No	No	No	Yes	Septic tank not use.
Oxnard	3,000	Yes	Yes	No	No.	
Pasadena	30,000	No	Yes	No	No	Municipal farm.
Paso Robles	1,500	No	No	Yes	No	Salinas River.
Patton (State Hospital)	1,500	Yes	Yes	No	No.	
Petaluma	6,000	No	No	No	Yes	Unsatisfactory.
Pomona	10,000	Yes	Yes	No	No.	
Porterville	3,500	Yes	Yes	No	No	Installed 1910.
Red Bluff	5,000	No	No	Yes	No	Sacramento River.
Redding	5,000	No	Yes	No	No	Sacramento River.
Redlands	8,000	No	Yes	No	No	Disposed of by contract with A. Gregory.
Redondo Beach	(2,500)	Yes	Yes	No	No	Summer resort.
Richmond	10,000	No	No	No	Yes	San Francisco Bay.
Riverside	15,000	Yes (?)	Yes	No	No.	
Sacramento	60,000	No	No	Yes	No	Sacramento River.
Salinas	4,500	No	No	Yes	No	Salinas River.
San Bernardino	16,500	No	Yes	No	No	Disposed of by contract with A. Gregory.
San Diego	40,000	No	No	No	Yes	San Diego Bay.
San Francisco	500,000	No	No	No	Yes	San Francisco Bay.
San Jose	40,000	No	No	No	Yes	San Francisco Bay.
San Rafael	6,000	No	No	No	Yes	San Pablo Bay.

Sewage Disposal in California Towns. Partiat List—Continued.

Town.	Population.*	Septic Tank.	Irrigation.	Dilution.		Remarks.
				Stream.	Salt Water.	
Santa Ana	10,000	Yes	Yes	No	No	Municipal farm.
Santa Rosa	6,000	Yes	Yes	No	No	Municipal farm.
Santa Monica	2,500	No	No	No	Yes	Electrical process.
Sawtelle (Soldiers' Home)	3,000	Yes	Yes	No	No.	
Sebastopol	1,500	Yes	No	No	No	Run on to flat land.
Selma	3,000	Yes	Yes	No	No	In operation 1909.
Shasta Retreat	800	No	No	Yes	No	Sacramento River.
Sisson	500	No	Part	Part	No	Sacramento River.
Stockton	30,000	No	No	Yes	No.	
Truckee	1,000	Yes	No	Yes	No	Truckee River.
Turlock	2,500	Yes	Yes	No	No.	
Ukiah	3,000	Poor	No	Yes	No	Russian River.
Visalia	6,500	No	Yes	No	No	Municipal farm.
Watsonville	5,000	No	No	Yes	No	Pajaro River.
Whittier	6,000	Yes	Yes	No	No	Installed 1910.
Whittier State School	1,000	Yes	Yes	No	No.	
Willows	2,000	No	Yes	No	No	Settling tank.
Woodland	4,000	No	No	No	No	Run on to flat land.

*Population estimated for purposes of tabulation.

The following data on septic tanks now in operation in California is added for convenient reference by those interested.

SEPTIC TANKS IN CALIFORNIA—PARTIAL LIST.

Town.	Population.*	Tank Dimensions.	Total Capacity.	Total Area.	Estimated Flow per Capita per Day	Estimated Storage.	Area per Person	Remarks.
Auburn	2,500	(5) 14 x 14 x 5 ft.	36,000 gals. 4,900 cu. ft.	980 sq. ft.			.4 sq. ft.	
Bakersfield	10,000	Circular, 200 ft diameter, 8 ft. deep	219,000 cu. ft. 1,640,000 gals.	31,400 sq. ft.	250 gals.	16 hrs.	3 sq. ft.	To be built 1910.
Colusa	1,500	(2) 180 x 6 x 7½ ft. (5 ft. sewage)	10,800 cu. ft. 75,000 gals.	2,106 sq. ft.			1.4 sq. ft.	New.
Corona	3,600	70 x 20 x 8 ft.	11,200 cu. ft. 84,000 gals.	1,400 sq. ft.	75 gals.	7.5 hrs.	.4 sq. ft.	New.
Eldredge (Sonoma State Home)	1,000	150 x 15 x 10	18,000 cu. ft. 135,000 gals.	2,250 sq ft.	135 gals.	24 hrs	2.25 sq. ft.	Good effluent.
Folsom (State Prison)	1,100		120,000 gals. 164,000 cu. ft.					
Fresno	25,000	(8) 36 x 90 x 6.5 ft.	1,230,000 gals.	26 000 sq. ft.	140 gals.	8 hrs.	1. sq. ft.	
Hanford	6,000	65 x 24 x 7 ft.	10,900 cu. ft. 82,000 gals.	1,560 sq. ft.	60 gals.	5-8 hrs.	.26 sq. ft.	
Livermore (1,500 connected)	2,200	40 x 75 x 4 ft.	12,000 cu. ft. 90,000 gals.	3,000 sq. ft.			2.0 sq. ft.	Doing good work.
Long Beach	20,000	610 x 6 x 6 ft.	22,000 cu. ft. 165,000 gals.	3,660 sq. ft.			.14 sq. ft.	Soon to be replaced.
Merced	3,500							
Patton (State Hospital)	1,500	[once Two units—only one used at 110 x 20 x 7.5 ft.	16,500 cu. ft. 123,000 gals.	2,200 sq. ft.	120 gals.	1 unit 8 hrs.	1 unit 1.5 sq. ft.	Very good type.
Pomona	10,000	45 x 24 x 8 ft.	8,650 cu. ft. 65,000 gals.	1,080 sq. ft.			.11 sq. ft.	Too small.
Porterville	3,500							New.
Redondo Beach	2,500	150 x 50 x 7.5	56,000 cu. ft. 420,000 gals.	7,590 sq. ft.			3. sq. ft.	
Riverside	15,000	(Pond) 350 x 90 x 3 ft.	9,500 cu. ft. 71,000 gals.	3,150 sq. ft.			.21 sq. ft	
Santa Ana (est. 7,500 connected)	10,000	100 x 20 x 8 ft.	16,000 cu. ft. 120,000 gals.	2,000 sq. ft.	48 gals.	6½ hrs.	.27 sq. ft.	Sludge accumulates.
Santa Rosa	6,000	Side slopes 1/1 250 x 27 x 8 ft.	40,000 cu. ft. 300,000 gals.	6,700 sq. ft.	125 gals.	10 hrs.	1.1 sq. ft.	
Sawtelle (Soldiers' Home)	3,000	(2) 70 x 20 x 8 ft.	22,400 cu. ft. 168,000 gals.	2,800 sq. ft.	110 gals.	6 hrs.	93 sq. ft.	Good types.
Sebastopol	1,500	160 x 15 x 6 ft.	14,400 cu. ft. 100,000 gals.	2,400 sq. ft.			1.6 sq. ft.	
Selma	3,000	100 x 40 x 8 ft.	32,000 cu ft. 240,000 gals.	4,000 sq. ft.	80 gals.	24 hrs.	1 3 sq. ft.	New.
Turlock	2,500	50 x 20 x 7 ft.	7,000 cu. ft. 52,500 gals.	1,000 sq. ft.	60 gals.	6-8 hrs.	.4 sq. ft.	New.
Ukiah (1,500 connected)	3,000	(2) 36 x 10 x 5 ft.	36,000 cu. ft. 270,000 gals.	720 sq. ft.			.48 sq. ft.	Small.
Whittier	6,000	96 x 20 x 10 ft.	19,000 cu. ft. 144,000 gals.	1,920 sq. ft.	80 gals.	6 hrs.	.32 sq. ft,	New.

* Estimated for purposes of tabulation.

COMMENTS.

A Substitute for the Fourth of July.—The historical pageants which are increasingly taking the place of the time honored firecracker methods of celebrating the fourth of July constitute one of the great preventive medicine influences of the day. In California those town councils, which are sensible enough and hard-hearted! enough to place the ban on fireworks as a measure of fire protection to towns and adjacent grain-fields are also aiding materially the preservation of life. It is in the interest of loyal as well as sensible citizenship for each California community to devise a substitute for the "gunpowder" fourth.

A Panacea for Sewage Ills.—The following comments are taken from a letter accompanying the article kindly furnished for this issue by Mr. George T. Palmer of the Massachusetts Institute of Technology:

The man with a small country estate bewails the difficulties he has been having with an overflowing cesspool. His neighbor, more widely read perhaps, suggests to him that a septic tank be constructed into which the house waste may be directed and from which there comes forth a harmless and purified liquid.

The first named gentleman thereupon makes some further inquiries among his friends, consults several newspaper articles, and, with the assistance of the town mason, proceeds to construct a closed brick receptacle with inlet and outlet pipes, baffle boards, and a system of subsurface tile pipes spreading about the garden. Such a contrivance may work, but the odds are greatly against it.

But why doesn't it work if the brick box is a septic tank? Because in all probability this particular cure was intended to relieve another ailment. It fails to work for the same reason that white pills 1-16 of an inch in diameter fail to suppress all ills. In other words, the diagnosis of the sewage ill should be made by a trained biologist who is also a sanitary engineer. However each landowner or even each small municipality can not afford this important personage for its own private use. The field is, therefore, open to the small-disposal-plant consulting engineer whose clientage is made up of individuals and towns in the vicinity.

Until such a sanitarian adviser comes into existence as a business person the State Board of Health must be looked to for advice in these matters. The careless location of a privy or the faulty construction of a septic tank may endanger many lives, the time of one trained man on the State Board could most advantageously be spent in advising simple and fundamental precautions in the many rapidly developing sections of the State.

A state law prohibiting householders from erecting a privy or other receptacle for the deposit of human excrement, until approval based on State regulations had been secured from the Local Board of Health, would assist greatly in cutting down the indiscriminate placing of filth containers where they may menace the health of innocent persons.

The "Transient" Town and its Sewage.—The excellent articles in this issue of the bulletin on summer camps and insanitary toilet facilities are full of suggestion, and their importance can not be overestimated. It is true that some eighty per cent of Californians live in sewered towns, but it is also true that upwards of twenty-five per cent of their number spend annually from two or three weeks to as many months in unsewered mountain, farm or orchard districts. The "transient" towns which spring into existence to provide for their comfort are a serious menace to the public health of the entire State. It is possible for a summer resort provided with inadequate sewage disposal arrangements, but otherwise having every convenience demanded by modern standards of living and cleanliness, to infect with typhoid fever a large percentage of its guests during a summer without a single guest developing the illness at the resort. This is possible because the incubation period (time for developing the symptoms after the typhoid "germs" have been taken into the body) is

usually longer than the average two-week vacation period and results in the guests returning to their home towns before "coming down" with the disease.

The Testimony of the Inspector and his Camera.—A year ago the State Board of Health began an investigation of the prevalence and distribution of diseases associated with water and soil pollution. A study of the tables from this investigation published above suggests that only a small percentage of California towns and cities are still polluting the inland waters of the State. Many of the systems of sewage treatment are inadequate, but they prove that the people are actively trying to comply with the law and with the demands of modern methods of conserving the public health.

There still remains the privy and cesspool pollution of farm and summer-resort wells and springs. The State Board is now carrying on field and laboratory investigations of this phase of the problem. While California does not have the wide spread conditions of soil pollution which Dr. Stiles describes in the South, yet the accumulating evidence of the inspector's camera should lead us to be careful about throwing stones at our neighboring states.

There is much to be done, and the present years of rapidly increasing population is the time to do it. The response of the people to public health needs has been most encouraging, wherever these needs have been clearly pointed out.

Sewage and Oysters.—The amendment to Food Inspection Decision No. 110, printed in this issue of the bulletin, should give us cause for thought. The decision closes with this sentence: "Oysters found in interstate commerce in a polluted condition because of the character of the water in which they are grown or floated are adulterated under the food and drugs act." The recent action of New Jersey in delegating to the United States the contractural right to supervise the sewage works which will drain the household wastes of the cities of the Passaic Valley into the New York harbor, is another cause for thought. California is not without oyster and other shellfish commercial interests. The problems of sewage pollution of the New York harbor and of Baltimore oyster beds are not without their interest to residents about the bay of San Francisco, and other sections of the State.

In the eyes of the entire world California's good health and great mountain playgrounds are her greatest assets. They must be conserved.

DEPARTMENT OF VITAL STATISTICS.

GEORGE D. LESLIE, STATISTICIAN.

VITAL STATISTICS FOR MAY.

Marriages.—The marriages reported for May number 1,858 as compared with 1,743 for the same month last year. For an estimated State population of 2,056,190 in 1910, the May total represents an annual rate of 10.6, against 13.4 for April.

The May totals were highest for the following counties: Los Angeles, 400; San Francisco, 316; Alameda, 181; Marin, 98; Orange, 76; Sacramento, 74; Santa Clara, 73; San Diego, 56; and Fresno, 53.

The aggregate for San Francisco and the other bay counties (Alameda, Contra Costa, Marin, and San Mateo) was 628.

Births.—For May there were reported 2,693 living births, representing an annual birth-rate of 15.4 per 1,000 population, as compared with 15.3 for the preceding month. The corresponding total for the same month the year before was 2,493.

The totals were highest for the following counties: Los Angeles, 666; San Francisco, 574; Alameda, 316; Fresno, 130; Santa Clara, 95; Sacramento, 79; San Diego, 58; and San Bernardino, 54.

Altogether, 1,767 births were registered in the twenty-six freeholders' charter cities, the leading cities being as follows: San Francisco, 574; Los Angeles, 497; Oakland, 203, Sacramento, 55; Alameda, 50; Berkeley, 46; San Diego, 44; Fresno, 41; San José, 39; Pasadena, 31; and Riverside, 28.

The aggregate for San Francisco and the transbay cities (Alameda, Berkeley, and Oakland) was 873, and for San Francisco and the other bay counties was 955. Similarly, the total for Los Angeles and neighboring chartered cities (Long Beach, Pasadena, and Santa Monica) was 555, and for the entire county was 666.

Deaths.—Exclusive of stillbirths, altogether 2,727 deaths were reported for May, this number including 140 delayed certificates for deaths in April or earlier months. The 2,727 deaths give an annual death-rate of 15.6, against 15.4 for the preceding month. The corresponding total for the same month last year was 2,577.

The May totals were highest for the following counties: Los Angeles, 588; San Francisco, 536; Alameda, 288; Sacramento, 114; San Diego, 93; Santa Clara, 86; San Bernardino, and San Joaquin, each 74; Fresno, 73; and Kern, 50.

There were altogether 1,623 deaths in the twenty-six chartered cities, the highest totals being as follows: San Francisco, 536; Los Angeles, 381; Oakland, 160; Sacramento, 80; San Diego, 69; Alameda, 41; San José, 40; Stockton, 38; Berkeley, 37; Pasadena, 32; and Fresno, 29.

The aggregate for the urban district (San Francisco and the transbay cities) was 774, and for the entire metropolitan area (San Francisco and the other bay counties) was 916. Similarly, the total for Los Angeles and neighboring chartered cities was 441, and for the whole county was 588.

Causes of Death.—For May there were reported 454 deaths, or 16.7 per cent of all, from various forms of tuberculosis, and 440, or 16.1 per cent, from diseases of the circulatory system, tuberculosis thus leading heart disease somewhat.

Other notable causes of death in May were as follows: Diseases of the respiratory system, 249; violence, 246; diseases of the digestive system, 243; diseases of the nervous system, 230; Bright's disease and nephritis, 181; cancer, 162; and epidemic diseases, 141.

The deaths from epidemic diseases were as follows: Whooping-cough, 33; typhoid fever, 27; measles, 26; diphtheria and croup, 18; and all other epidemic diseases, 37. Typhoid fever, usually the leading epidemic disease, was surpassed by whooping-cough for May as for the preceding three months.

The deaths from the three leading epidemic diseases reported for May were distributed by counties as follows:

Whooping-cough.		Typhoid Fever.		Measles.	
Alameda	7	Alameda	4	Butte	2
Butte	1	Kings	1	Los Angeles	8
Fresno	2	Los Angeles	3	Mendocino	1
Kern	1	Marin	1	Orange	3
Los Angeles	2	Orange	1	Sacramento	1
Mendocino	1	Riverside	2	San Bernardino	2
Merced	1	Sacramento	1	San Diego	1
Sacramento	1	San Bernardino	1	San Francisco	2
San Francisco	7	San Francisco	5	San Joaquin	1
San Luis Obispo	1	San Joaquin	2	Santa Clara	2
San Mateo	4	San Luis Obispo	2	Solano	1
Santa Clara	2	Santa Clara	1	Sonoma	1
Tulare	3	Tulare	3	Yolo	1
Total	33	Total	27	Total	26

Further particulars appear in the following table:

Deaths from Certain Principal Causes, with Proportion per 1,000 Total Deaths for Current and Preceding Month, for California: May.

Cause of Death.	Deaths: May.	Proportion per 1,000.	
		May.	April.
All Causes	2,727	1,000.0	1,000.0
Typhoid fever	27	9.9	12.6
Malarial fever	6	2.2	1.5
Measles	26	9.5	10.4
Scarlet fever	8	2.9	1.9
Whooping-cough	33	12.1	13.8
Diphtheria and croup	18	6.6	8.4
Influenza	4	1.5	3.0
Other epidemic diseases	19	7.0	5.4
Tuberculosis of lungs	364	133.5	139.7
Tuberculosis of other organs	90	33.0	21.5
Cancer	162	59.4	56.8
Other general diseases	124	45.5	51.8
Meningitis	32	11.7	9.2
Other diseases of nervous system	198	72.6	75.6
Diseases of circulatory system	440	161.3	163.9
Pneumonia and broncho-pneumonia	195	71.5	70.2
Other diseases of respiratory system	54	19.8	23.0
Diarrhea and enteritis, under 2 years	93	34.1	21.1
Diarrhea and enteritis, 2 years and over	21	7.7	7.7
Other diseases of digestive system	129	47.3	48.0
Bright's disease and nephritis	181	64.4	64.1
Childbirth	30	11.0	10.0
Diseases of early infancy	97	35.6	31.1
Suicide	45	16.5	20.3
Other violence	201	73.7	71.4
All other causes	130	47.7	57.6

Geographic Divisions.—Data for geographic divisions, including the metropolitan area, or "Greater San Francisco," are as follows:

Deaths from Main Classes of Diseases, for Geographic Divisions: May.

Geographic Division.	Deaths: May.										
	All Causes	Epidemic Diseases	Tuberculosis (All Forms)	Cancer	Diseases of Nervous System	Diseases of Circulatory System	Diseases of Respiratory System	Diseases of Digestive System	Bright's Disease and Nephritis	Violence	All Other Causes
THE STATE	2,727	141	454	162	230	440	249	243	181	246	381
Northern California	289	16	52	9	36	35	23	19	16	36	47
Coast counties	154	7	28	7	26	19	9	13	7	18	20
Interior counties	135	9	24	2	10	16	14	6	9	18	27
Central California	1,558	84	226	88	108	272	163	143	113	149	212
San Francisco	536	24	70	31	32	112	67	44	40	43	73
Other bay counties	380	20	53	29	29	76	42	20	25	34	52
Coast counties	169	8	32	8	12	25	11	20	15	11	27
Interior counties	473	32	71	20	35	59	43	59	33	61	60
Southern California	880	41	176	65	86	133	63	81	52	61	122
Los Angeles	588	22	110	43	52	104	51	46	40	38	82
Other counties	292	19	66	22	34	29	12	35	12	23	40
Northern and Central California	1,847	100	278	97	144	307	186	162	129	185	259
Metropolitan area	916	44	123	60	61	188	109	64	65	77	125
Rural counties	931	56	155	37	83	119	77	98	64	108	134

DEPARTMENT OF BACTERIOLOGY.

DR. A. R. WARD, DIRECTOR.

EXAMINATIONS MADE DURING MAY, 1910.

	Ex.-Pos.	Ex-Neg.	Total.
Diphtheria	59	96	155
Malaria	--	--	--
Tuberculosis	2	26	28
Typhoid	7	12	19
Water	3	4	7
Miscellaneous	1	3	4
Rabies	4	2	6
Total			219

DEPARTMENT OF PURE FOODS AND DRUGS.

PROFESSOR M. E. JAFFA, DIRECTOR.

The following Food Inspection Decision has just been received at the State Laboratory. This is of interest to candy manufacturers in California and answers questions relative to that point which have been received by this Department:

FOOD INSPECTION DECISION 119.

USE OF SHELLAC AND OTHER GUMS FOR COATING CHOCOLATES AND OTHER CONFECTIONS.

The Board of Food and Drug Inspection has carefully considered the evidence which has been presented at various times respecting the practice of coating chocolates and other confections with shellac and other gums.

The Board is of the opinion that it is not a proper proceeding under the provisions of the Food and Drugs Act. It is evident that such coating will not only conceal inferiority, but it appears further that as a rule the gums are dissolved in alcohol. One man in giving evidence before the Board stated that in his opinion there was no objection to wood alcohol as a solvent. In dipping confections into an alcoholic solution of a gum a certain quantity of the alcohol must necessarily permeate the product. Evidence is adduced showing that the product is not submitted to any subsequent process of heating whereby the traces of alcohol could be removed. Although only mere traces of alcohol may remain, the addition of these substances, and especially of wood alcohol, to a confection is specifically prohibited by the act. Evidence is also in the possession of the Board to show that a large number of the manufacturers either never have employed this method or have discontinued it, and that goods can be, and are, made and sold in all quantities with no difficulty without the use of shellac or other gums. Evidence further shows that one of the reasons for adding the coating is that the goods may be held for a longer time. The exposure of confections for a long while before use is not advisable nor desirable.

FOOD INSPECTION DECISION 120.

LABELING OF OHIO AND MISSOURI WINES.

The question has arisen whether fermented beverages made in the states of Ohio and Missouri by the addition of a solution of sugar and water to the natural juice of grapes before fermentation may be labeled, under the Food and Drugs Act, as "Ohio Wine," or "Missouri Wine," respectively, without further qualification. In Food Inspection Decision 109 it was announced that the term "wine" without qualification is properly applied only to the product made from the normal alcoholic fermentation of the juice of sound, ripe grapes without addition or abstraction, except such as may occur in the usual cellar treatment for clarifying and aging.

It has been decided after a careful review that the previous announcement is correct and that the term "wine" without further characterization must be restricted to products made from untreated must without other addition or abstraction than that which may occur in the usual cellar treatment for clarifying and aging. However, it has been found that it is impracticable, on account of natural conditions of soil and climate, to produce a merchantable wine in the states of Ohio and Missouri without the addition of a sugar solution to the grape must before fermentation. This condition has recognition in the laws of the State of Ohio, by which wine is defined to mean the fermented juice of undried grapes, and it is provided that the addition, within certain limits, of pure white or crystallized sugar to perfect the wine or the use of the necessary things to clarify and refine the wine, which are not injurious to health, shall not be construed as adulterations and that the resultant product may be sold under the name of "wine." Furthermore, it is permitted in some of the leading wine-producing countries of Europe to add sugar to the grape juice and wine, under restrictions, to remedy the natural deficiency in sugar or alcohol, or an excess of acidity, to such an extent as to make the quality correspond to that of wine produced, without any admixture, from grapes of the same kind and vintage in good years. It is conceived that there is no difference in principle in the adding of sugar to must in poor years to improve the quality of the wine than in the adding of sugar to the must every year for the same purpose in localities where the grapes are always deficient.

In view of this practice, and having regard to the fact that fermented beverages have been produced in the states of Ohio and Missouri by the addition of a sugar solution to grape must before fermentation and sold and labeled as "Ohio Wine," and "Missouri Wine," respectively, for a period of over sixty years, it is held a compliance with the terms of Food Inspection Decision 109 if the product made from Ohio and Missouri grapes by complete fermentation of the must under proper cellar treatment, and corrected by the addition of a sugar solution to the must before fermentation so that the resultant product does not contain less than five parts per thousand acid and not more than 13 per cent of alcohol after complete fermentation, are labeled as "Ohio Wine" or "Missouri Wine," as the case may be, qualified by the name of the particular kind or type to which it belongs.

An Ohio or Missouri dry still wine made as above stated and sweetened with a sugar solution which does not increase the volume of the wine more than 10 per cent, and fortified with tax-paid spirits, may be labeled as "Ohio Sweet Wine" or "Missouri Sweet Wine," as the case may be, qualified by the name of the particular kind or type to which it belongs.

The product made in Ohio and Missouri by the addition of water and sugar to the pomace of grapes from which the juice has been partially expressed, and by fermenting the mixtures until a fermented beverage is produced, may be labeled as "Ohio Pomace Wine" or "Missouri Pomace Wine," as the case may be. If a sugar solution be added to such products for the purpose of sweetening after fermentation they should be characterized as "Sweet Pomace Wines." The addition to such products of any artificial coloring matter or sweetening or preservative other than sugar must be declared plainly on the label to render such products free from exception under the Food and Drugs Act.

FOOD INSPECTION DECISION 121.

THE FLOATING OF SHELLFISH. (Amendment to F. I. D. 110.)

Considerable evidence has been submitted to the Department since the issuance of Food Inspection Decision 110 on the practice of floating or drinking oysters in water of less saline content than that in which they were grown to maturity.

Full consideration has been given to all the hearings and to the briefs and other information submitted subsequent to the hearings, and the Board is of the opinion that it is not improper to drink oysters in water of a saline content equal to that in which oysters will grow to maturity. If, however, oysters are floated in water of a less salient content than that in which oysters will properly mature, the packages containing such oysters must be very clearly and legibly labeled "Floated Oysters," otherwise they will be considered adulterated under section 7 of the law.

Particular attention should be paid by the growers and handlers of oysters to the character of the water in which the oysters are brought to maturity or floated. Where such waters are polluted it will invariably follow that the oysters will also partake of this pollution, and subsequent washing of the oysters, or even floating in water which is not polluted, is likely not to cleanse them of this pollution.

Oysters found in interstate commerce in a polluted condition because of the character of the water in which they are grown or floated are adulterated under the Food and Drugs Act.

NOTICE OF JUDGMENTS.

The following notices have been received since the publication of the last Bulletin. Full copies of the different notices may be obtained upon application to the State Laboratory, Berkeley, California.

Notice of Judgment No. 266.—Dr. Johnson's Treatment for Cancer, misbranding of. Misleading statements.

Notice of Judgments Nos. 267, 287.—Milk, adulteration of. Presence of water and other mixed substance.

Notice of Judgments Nos. 268, 285.—Cream, adulteration of. Butter fat abstracted.

Notice of Judgment, No. 269.—Honey, misbranding of. Misleading statements.

Notice of Judgment No. 270.—Molasses, adulteration and misbranding of. Presence of glucose.

Notice of Judgments Nos. 271, 283, 290.—Cane and Maple Syrup. Maple Syrup. Lack of presence of maple syrup—contained refined cane sugar with extract maple wood.

Notice of Judgment No. 272.—Egg, desiccated, adulteration of. Unfit for consumption.

Notice of Judgment No. 273.—Milk, powdered, adulteration and misbranding of. Low percentage of butter fat.

Notice of Judgments Nos, 274, 278, 286, 289.—Vinegar, misbranding of. Presence of foreign material.

Notice of Judgment No. 275.—Coffee, misbranding of. Distinctive name of another article used.

Notice of Judgment No. 276.—Analgine Tablets, misbranding of. Presence of acetanilid.

Notice of Judgments Nos. 277, 281.—Lemon Flavor, adulteration and misbranding of. Presence of methyl alcohol; also coal-tar dye, artificially colored.

Notice of Judgment No. 279.—Lemonade Powder and Orangeade Powder, adulteration and misbranding of. Citric acid product; artificially colored and flavored.

Notice of Judgment No. 280.—Salt, misbranding of. Not foreign product, but domestic make.

Notice of Judgment No. 282.—Sardines (canned), adulteration of. Presence of tin.

Notice of Judgment No. 284.—Danderine, misbranding of. Quantity of alcohol not mentioned.

Notice of Judgment No. 288.—Black Pepper, adulteration and misbranding of. Mixture of wheat, capsicum and fruit shells along with ground black pepper.

Notice of Judgment No. 382.—Bleached Flour, adulteration and misbranding of. Copies of this Notice of Judgment consisting of forty-seven printed pages, may be had upon application to the Director of the State Food and Drug Laboratory, University of California, Berkeley, California.

The little publication contains the testimony of a large number of experts on this subject, and is therefore of interest to those concerned in the manufacture and sale of flour.

Notice of Judgment No. 291.—Neufchatel Cheese, adulteration and misbranding of. False and misleading statements.

Notice of Judgment No. 292.—Powdered Colocynth, adulteration and misbranding of. False and misleading statements.

Notice of Judgment No. 293.—Wintergreen, essence of, adulteration and misbranding of. Artificially colored; misleading statements.

Notice of Judgment No. 294.—Drug, "Make-Man Tablets," misbranding of. False and misleading statements.

Notice of Judgments Nos. 295, 305.—Eggs, desiccated, adulteration of. Containing filthy, decomposed, putrid substance.

Notice of Judgment No. 296.—"Kos-Kola," adulteration and misbranding of. Presence of cocaine not stated on label.

Notice of Judgment No. 297.—Pepper, adulteration and misbranding of. Ash and sand added; statements false.

Notice of Judgment No. 298.—"Cerecut," misbranding of a feed. Statement false and misleading.

Notice of Judgment No. 299.—Ice, adulteration of. Contained an added poisonous and deleterious ingredient; filthy, putrid substance.

Notice of Judgment No. 300.—Calcium Acid Phosphate, alleged adulteration and misbranding of. Corn starch added.

Notice of Judgments Nos. 301, 320.—Vanilla Flavor, adulteration and misbranding of. Artificially colored; statements false and misleading.

Notice of Judgment No. 302.—Syrup, misbranding of. (Short measure.)

Notice of Judgment No. 303.—Cod Liver Oil Compound, metabolized, misbranding of. Product contained salicylic acid.

Notice of Judgments Nos. 304, 311, 318.—Vinegar, adulteration and misbranding of. Added foreign substance; artificially colored; underweight.

Notice of Judgment No. 306.—Fish, misbranding of. Misleading statements.

Notice of Judgments Nos. 307, 308.—Cream, adulteration of. Butter fat and milk fat abstracted therefrom.

Notice of Judgment No. 309.—"Coke Extract," misbranding of. (Soft drink containing cocaine.)

Notice of Judgment No. 310.—"Kola-Ade," adulteration and misbranding of. (Soft drink containing cocaine.)

Notice of Judgment No. 312.—Milk, adulteration of. Presence of water.

Notice of Judgment No. 313.—Extract-Lemon, adulteration and misbranding of. False and misleading statements.

Notice of Judgment No. 314.—Feed, "Globe Flour Middlings," adulteration and misbranding of. Substitution ground corn cobs, etc.

Notice of Judgment No. 315.—Feed, "International Gluten," adulteration and misbranding of. Substitution ground corn cobs.

Notice of Judgment No. 316.—Raisins, misbranding of. Statements false and misleading.

Notice of Judgment No. 317.—Flour, Buckwheat, adulteration and misbranding of. False and misleading statements; substitution of wheat product.

Notice of Judgment No. 319.—Drug, Hair Tonic, misbranding of. False and misleading statements.

Notice of Judgment No. 321.—Peas, canned, misbranding of. (Short weight.)

Notice of Judgment No. 322.—Stock Food, "Corn Alfalfa Horse Feed," misbranding of. Misleading statements.

Notice of Judgment No. 323.—Drug, "Remedy for Hay Fever and Catarrh," misbranding of. Presence of cocaine hydrochloride not stated on label.

DEPARTMENT OF EPIDEMIOLOGY.

WILLIAM F. SNOW.

The Board of Health has been coöperating during the month with Dr. R. B. Knight, Health Officer of Stockton, in investigating the occurrence of a number of cases of poliomyelitis anterior among children within a radius of fifteen miles of the city. Sufficient data has not been collected as yet, to discuss the epidemiology of the outbreak in this issue of the bulletin. The State Board desires any information that will lead to the identifying of any other cases any where within the State.

LIST OF COUNTY HEALTH OFFICERS.

County.	*Health Officer.*	*Address.*
Alameda	Dr. C. L. McKown	Niles
Alpine		
Amador	Dr. E. E. Endicott	Jackson
Butte	Dr. L. Q. Thompson	Oroville
Calaveras	Dr. E. W. Weirich	Angels Camp
Colusa	Dr. C. A. Poage	Colusa
Contra Costa	Dr. F. S. Gregory	Antioch
Del Norte		
El Dorado	Dr. S. H. Rantz	Placerville
Fresno	Dr. G. L. Long	Fresno
Glenn	Dr. J. A. Randolph	Willows
Humboldt	Dr. J. H. Mallery	Eureka
Imperial	Dr. Virgil McCombs	Imperial
Inyo	Dr. I. J. Woodin	Independence
Kern	Dr. W. S. Fowler	Bakersfield
Kings	Dr. W. H. Miller	Hanford
Lake	Dr. W. E. Upton	Kelseyville
Lassen	Dr. E. C. Houston	Bieber
Los Angeles	Dr. O. R. Stafford	3754 Vermont ave., Los Angeles
Madera	Dr. Mary R. Butin	Madera
Marin	Dr. J. H. Kuser	Novato
Mariposa	Dr. H. Kylberg	Mariposa
Mendocino	Dr. John S. Hogshead	Ukiah
Merced	Dr. W. E. Lilley	Merced
Modoc	Dr John Stile	Alturas
Mono		
Monterey	Dr. Garth Parker	Salinas
Napa	Dr. Adolph J. Kahn (County Physician)	Napa
Nevada	Dr. John T. Jones	Grass Valley
Orange	Dr. C. D. Ball	Santa Ana
Placer	Dr. G. H. Fay	Auburn
Plumas	Dr. G. B. Lasswell	Quincy
Riverside	Dr. Geo. E. Tucker	Riverside
Sacramento	Dr. Hugh Beattie	Elk Grove
San Benito	Dr. R. G. Curtis	Hollister
San Bernardino	Dr. D. C. Strong	San Bernardino
San Diego		
San Francisco	Dr. W. F. McNutt, Jr.	San Francisco
San Joaquin	Dr. R. B. Knight	Stockton
San Luis Obispo	Dr. H. M. Cox	San Luis Obispo
San Mateo	Dr. W. G. Beattie	Colma
Santa Barbara	Dr. J. C. Bainbridge	Santa Barbara
Santa Clara	Dr. Wm. Simpson	San Jose
Santa Cruz		
Shasta	Dr. F. Stabel	Redding
Sierra	Dr. R. B. Davy	Downieville
Siskiyou	Dr. F. J. McNulty (County Physician)	Yreka
Solano	Dr. S. G. Bransford	Suisun
Sonoma	Dr. S. S. Bogle	Santa Rosa
Stanislaus	Dr. F. R. De Lappe	Modesto
Sutter	Dr. J. McFadyen	Yuba City
Tehama	Dr. A. P. Tarter	Tehama
Trinity	Dr. D. B. Fields	Weaverville
Tulare	Dr. F. A. Coombs	Visalia
Tuolumne	Dr. C. E. Congdon	Jamestown
Ventura	Dr. A. A. Maulhardt	Oxnard
Yolo	Dr. A. E. Blevins	Woodland
Yuba	Dr. J. H. Barr	Marysville

CALIFORNIA STATE BOARD OF HEALTH.

PARTIAL LIST OF PUBLIC HEALTH ORGANIZATIONS OF CALIFORNIA.

1. General.
   California Public Health Association.
   Public Health Commission of State Medical Society.
2. For the Prevention of Tuberculosis.
   California Association for the Study and Prevention of Tuberculosis.
   Affiliated societies: Alameda County . . ; Long Beach . . ; Los Angeles . . ; Monrovia (Visiting Nurses' Association) ; Pasadena . . ; Redlands . . ; Sacramento (White Crusaders) ; San Diego . . ; San Francisco . . ; Santa Ana . . ; Santa Barbara . . ; Sierra Madre . . .
3. For the Prevention of Syphilis and Gonorrhea.
   California Association for the Study and Prevention of Syphilis and Gonorrhea (R. A. Archibald, M.D., Secretary, Health Office, Oakland, Cal.).
4. Other Organizations carrying on Important Public Health Work.
   1. California Federation of Women's Clubs.
   2. California Teachers' Association (L. E. Armstrong, Secretary, Oakland, Cal.).
   3. California Press Association (F. W. Richardson, President, Berkeley, Cal.).
   4. Board of Charities and Corrections (W. S. Gates, Secretary, San Francisco).
   5. California Playground Association (F. W. D'Evelyn, M.D., Secretary, 1214 Polk street, San Francisco).
   6. Red Cross Society and Divisions.
   7. White Crusaders. (W. A. Briggs, M.D., President, Sacramento, Cal.).
   8. Volunteers of America.
   9. Salvation Army.
   10. Juvenile Courts.

This list is only partially completed and will be repeated, with additions, next month. Any letters or questions sent to the Board will be answered or referred to the above mentioned organizations.

PARTIAL LIST OF CITY HEALTH OFFICERS.

Alameda.....Dr. L. W. Stidham	Mill Valley.....Capt. M. Staples
Alhambra.....Dr. F. E. Corey	Modesto.....Dr. F. R. De Lappe
Alturas.....Dr. John Stile	Mojave.....Mr. A. Smith
Anaheim.....Dr. J. L. Beebe	Monrovia.....Dr. R. D. Adams
Antioch.....E. C. Worrell	Monterey.....Martin Birks
Auburn.....Dr. R. F. Rooney	Morgan Hill.....Dr. D. W. Watt
Azusa.....Dr. S. A. Ellis	Mountain View.....Dr. Philo Hull
Berkeley.....Dr. J. J. Benton	Napa.....J. D. Treadway
Biggs.....Dr. B. Caldwell	National City.....Dr. Theo. F. Johnson
Black Diamond.....Dr. F. S. Gregory	Nevada City.....Hugh Murchie
Bakersfield.....J. E. Yancey	Oakland.....Dr. E. N. Ewer
Chico.....G. H. Taylor	Ontario.....Dr. C. S. Orr
Coalinga.....Dr. H. C. Warren	Orange.....Dr. F. L. Champline
Colton.....Dr. J. A. Champion	Oroville.....Dr. W. F. Gates
Colusa.....Dr. W. T. Rathbun	Oxnard.....Dr. Ralph W. Avery
Coronado.....Dr. Raffaele Lorini	Pacific Grove.....Dr. H. N. Yates
Doris.....Dr. A. A. Atkinson	Palo Alto.....Dr. Chas. Boxmeyer
Dixon.....W. C. Rhem	Pasadena.....Dr. Stanley P. Black
East San Jose.....Dr. W. A. Low	Petaluma.....Dr. R. B. Duncan
Elsinore.....Dr. Hugh Walker	Placerville.....Robert L. Crocker
Escondido.....Dr. David Crise	Pomona.....Dr. T. J. Wilson
Etna.....Dr. W. H. Haines	Piedmont.....Geo. T. Burtchael
Eureka.....Dr. W. L. Perrott	Randsburg.....Mr. E. B. McGinnes
Fairfield.....Dr. S. G. Bransford	Redding.....L. D. Poole
Ferndale.....Dr. L. Michael	Redlands.....Dr. J. M. Wheat
Fort Jones.....Thos. Bransom	Redondo Beach.....Dr. D. R. Hancock
Fresno.....Dr. Geo. H. Aiken	Richmond.....Dr. Chas. R. Blake
Gilroy.....Dr. Jonas Clark	Riverside.....Dr. Thos. R. Griffith
Glendale.....R. E. Chase	Sacramento.....Dr. Wm. K. Lindsay
Grass Valley.....Dr. J. T. Jones	Salinas.....S. A. McCollum
Hayward.....Dr. F. W. Browning	San Bernardino.....Dr. J. G. Ham
Healdsburg.....Dr. O. C. Hueb	San Diego.....Dr. F. H. Mead
Hermosa Beach.....H. Vetter	San Francisco.....Dr. W. F. McNutt, Jr.
Hollywood.....E. O. Palmer	San Jose.....Dr. A. L. Cothran
Huntington Park.....Dr. W. Thompson	San Jacinto.....Charles Long
Kernville.....Mr. J. W. Sumner	Santa Ana.....Dr. J. I. Clark
Lakeport.....Dr. H. P. Stippe	Santa Barbara.....Dr. T. A. Stoddard
Lindsay.....Dr. Walter W. Tourtillott	Santa Cruz.....Dr. C. H. Anderson
Livermore.....Dr. H. G. McGill	Santa Monica.....Dr. W. H. Parker
Lodi.....Dr. F. W. Colman	Santa Rosa.....Dr. Jackson Temple, Jr.
Long Beach.....Dr. W. H. Newman	Sisson.....Dr. L. Gouzuet
Los Angeles.....Dr. L. M. Powers	South Pasadena.....Dr. C. A. Whiting
Los Gatos.....Dr. Elenor S. Yelland	Stockton.....Dr. S. W. R. Langdon
Madera.....Dr. Mary R. Butin	Taft.....Mr. J. W. Bursell
Maricopa.....Mr. Thad Cheeney	Turlock.....Dr. E. L. Clough
Martinez.....Dr. E. E. Brown	Vallejo.....Dr. F. T. Bond
McKittrick.....Mr. G. M. Chitwood	Watsonville.....Dr. F. H. Koepke
Merced.....Dr. C. H. Castle	Yreka.....Dr. A. J. Collar